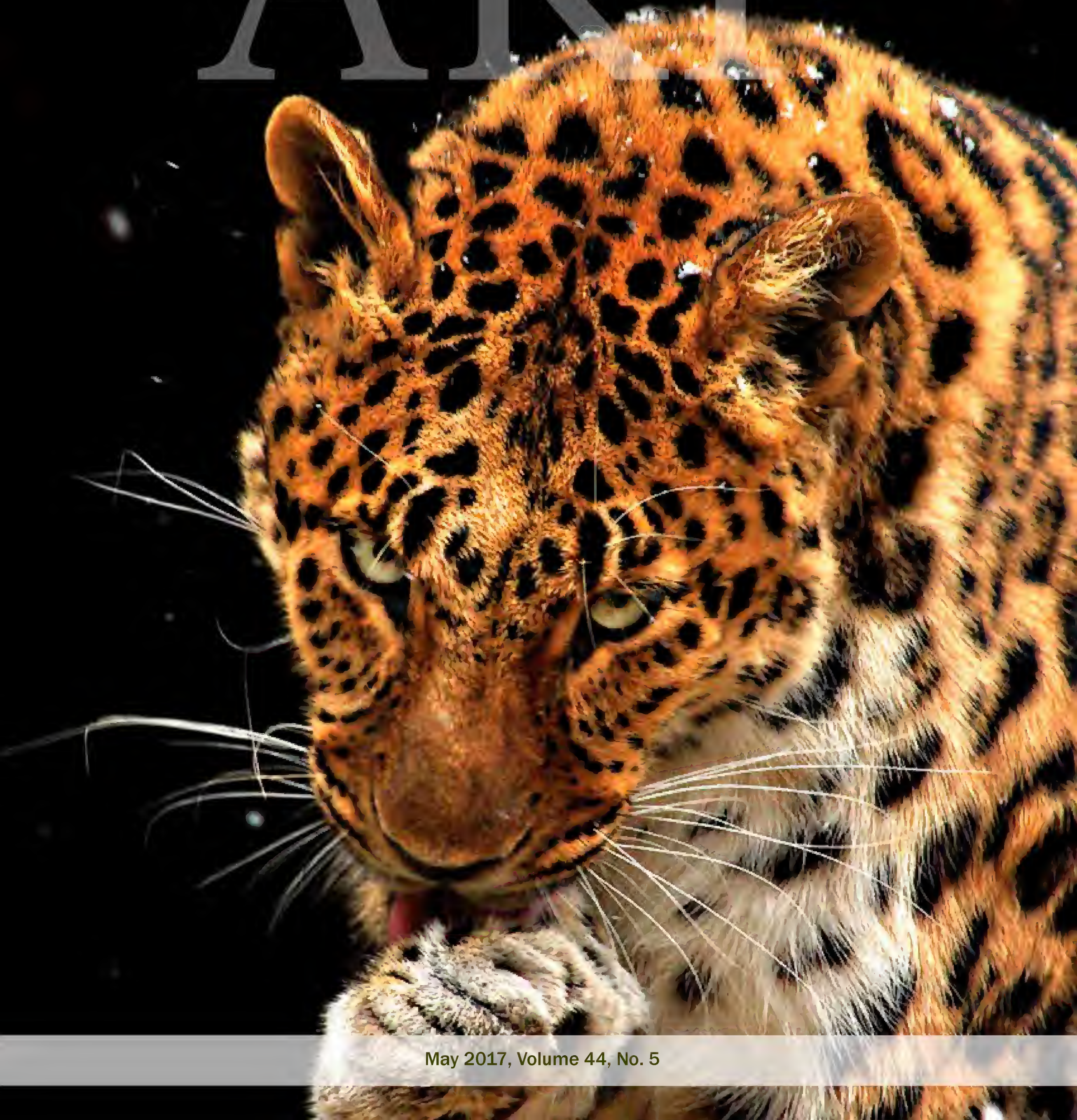
The Journal of the American Association of Zoo Keepers, Inc.

AKF

Animal Keepers' Forum



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American Association of Zoo Keepers, Inc.

The American Association of Zoo Keepers, Inc. exists to advance excellence in the animal keeping profession, foster effective communication beneficial to animal care, support deserving conservation projects, and promote the preservation of our natural resources and animal life.

ABOUT THE COVER

This month's cover features the winning photo of AAZK's Golden Animal Photo Contest to celebrate AAZK's Golden 50th Anniversary. The winning photo was submitted by Amanda Westerlund, Marine Mammal Keeper, of Pittsburgh Zoo & PPG Aquarium. In addition to having her photo placed on the cover of the AKF, Amanda receives a gift certificate toward $50 in AAZK merchandise.

Katerina was an Amur leopard at the Pittsburgh Zoo & PPG Aquarium. Here she is grooming during a light December snowfall from inside her cave. Katerina arrived at the Pittsburgh Zoo & PPG Aquarium in 1997 at the age of two, was mother to three cubs, and was a favorite of many zoo visitors. Known for her fiery leopard attitude, she would often hiss quietly at visitors while watching from her log. She passed away at the age of 17, living much longer than her wild counterparts. Amur leopards are known for their yellow/gold coats, dotted with spots and rosettes that allows for camouflage. With only 70 individuals remaining in their native range, Katerina was an essential ambassador for education and giving a face to the plight of these critically endangered big cats.

Articles sent to ***Animal Keepers' Forum*** will be reviewed by the editorial staff for publication. Articles of a research or technical nature will be submitted to one or more of the zoo professionals who serve as referees for ***AKF***. No commitment is made to the author, but an effort will be made to publish articles as soon as possible. Lengthy articles may be separated into monthly installments at the discretion of the Editor. The Editor reserves the right to edit material without consultation unless approval is requested in writing by the author. Materials submitted will not be returned unless accompanied by a stamped, self-addressed, appropriately-sized envelope. Telephone, fax or e-mail contributions of late-breaking news or last-minute insertions are accepted as space allows. Phone (330) 483-1104; FAX (330) 483-1444; e-mail is shane.good@aazk.org. If you have questions about submission guidelines, please contact the Editor. Submission guidelines are also found at: aazk.org/akf-submission-guidelines/.

Deadline for each regular issue is the 3rd of the preceding month. Dedicated issues may have separate deadline dates and will be noted by the Editor.

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ANIMAL KEEPERS' FORUM

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FROM THE PRESIDENT

It is an election year for the American Association of Zoo Keepers' Board of Directors! This year there were four Board Member positions open. Two positions were due to current Board Member terms expiring and two are new positions due to the increased number of committees that have been formed recently.

The number of Directors is based upon the needs of the Association and committee/program oversights. There is a minimum of five AAZK Board Members, and a maximum of seven Board Members serving at any time, so there is an uneven number of sitting Directors to facilitate the voting process. AAZK received four nominations for the AAZK Board of Directors and each met the qualifications. Therefore, no election process was necessary and these four candidates were ratified by the current AAZK Board and now become Board-Elect Members. They will be sworn in at the AAZK National Conference in Washington DC, August 27-31, 2017.

Many Board Members have served on a committee or as a Chapter Officer in the past and this is a great way to gain professional development experience. Before serving in this position, I was Co-chair of the Conservation Committee and was the treasurer for my local AAZK Chapter. This year is no exception with all the Board-Elect Members having made significant service contributions to AAZK over the years.

I am pleased and proud to announce your new Board Members who will join sitting Board Members Bethany Bingham, Bill Steele and Mary Ann Cisneros. Introducing your new Board Members:

- **Paul Brandenburger from the Maryland Zoo in Baltimore**
  Paul is a member of the Greater Baltimore Chapter of AAZK and has served as both Chapter Liaison and President. He is currently a member of the National AAZK Resource Committee and Team Leader for Chapter Resources and Networking. He has also been an integral member of the National Zoo Keeper Week Program.

- **Lee Hart from the Dickerson Park Zoo in Springfield Missouri**
  Lee has provided leadership of the Ozarks Chapter of AAZK as President, Vice President, Secretary and Liaison. He is a keeper in the Tropical Asia section of the Dickerson Park Zoo and actively partners with multiple departments on exhibit design and serves on the Safety and Firearms Response Committees of the Zoo.

- **Hardy Kern from the Columbus Zoo and Aquarium in Ohio**
  Hardy is a member of the Columbus AAZK Chapter and is a member of the National Communication and Grants Committees and the Trees for You and Me Program. He is the Social Media Team Leader and is currently responsible for posting the daily content for the AAZK Facebook Page and Twitter account.

- **Azzara Oston is from Maritime Aquarium at Norwalk**
  Azzara is Vice President of the Beardsley Zoo AAZK Chapter and their Enrichment Committee Chair. She is a member of the National AAZK Resource Committee and a member of the Keeper and Member Resources Team working on compiling documents on interview skills, resume and cover letter guidelines and consolidating materials on advancing keeper skills.

Thank you for your membership,

Penny Jolly

Penny Jolly
AAZK President

Paul Brandenburger

Lee Hart

Hardy Kern

Azzara Oston

COMING EVENTS

Post upcoming events here!
e-mail shane.good@aazk.org

June 5-9, 2017
Practical Zoo Nutrition Management
Front Royal, VA
Hosted by the Smithsonian-Mason School of Conservation and the National Zoological Park
For more information go to:
http://smconservation.gmu.edu/programs/graduate-and-professional/professional-training-courses/nutrition/

July 12-22, 2017
International Herpetological Symposium
Rodeo, NM
Hosted by Chiricahua Desert Museum
For more information go to:
internationalherpetologicalsymposium.com/40th-annual-symposium/

July 31 - Aug 4, 2017
Elephants 360: Advancing Health and Wellness
Cleveland, OH
Hosted by Cleveland Metroparks Zoo
For more information go to:
ClevelandZooSociety.org/Elephants360

August 7-11, 2017
International Rhino Keeper Workshop
Denver, CO
Hosted by Denver Zoo
For more information go to:
rhinokeeperassociation.org/

August 28-30, 2017
Old World Monkey Husbandry Workshop
Columbus, OH
Hosted by Columbus Zoo
For more information contact Audra Meinelt:
Audra.Meinelt@columbuszoo.org

September 5-7, 2017
Canid and Hyaenid TAG Husbandry Course
Cincinnati, OH
Hosted by Cincinnati Zoo
For more information go to:
http://cincinnatizoo.org/canid-and-hyaenid-tag-husbandry-course/

September 9-13, 2017
AZA Annual Conference
Indianapolis, IN
Hosted by Indianapolis Zoo
For more information go to:
www.aza.org/conferences-meetings

September 26-30, 2017
New World Primate Husbandry Workshop
Colorado Springs, CO
Hosted by Cheyenne Mountain Zoo
To register go to:
https://www.bpzoo.org/nwptag-conference-registration/

October 1-4, 2017
Orangutan SSP Husbandry Workshop
New Orleans, Louisiana
Hosted by Audubon Zoo
For more information go to:
http://audubonnatureinstitute.org/conservation-programs/1309-orangutan-ssp-workshop

AMERICAN
ASSOCIATION
of ZOO KEEPERS

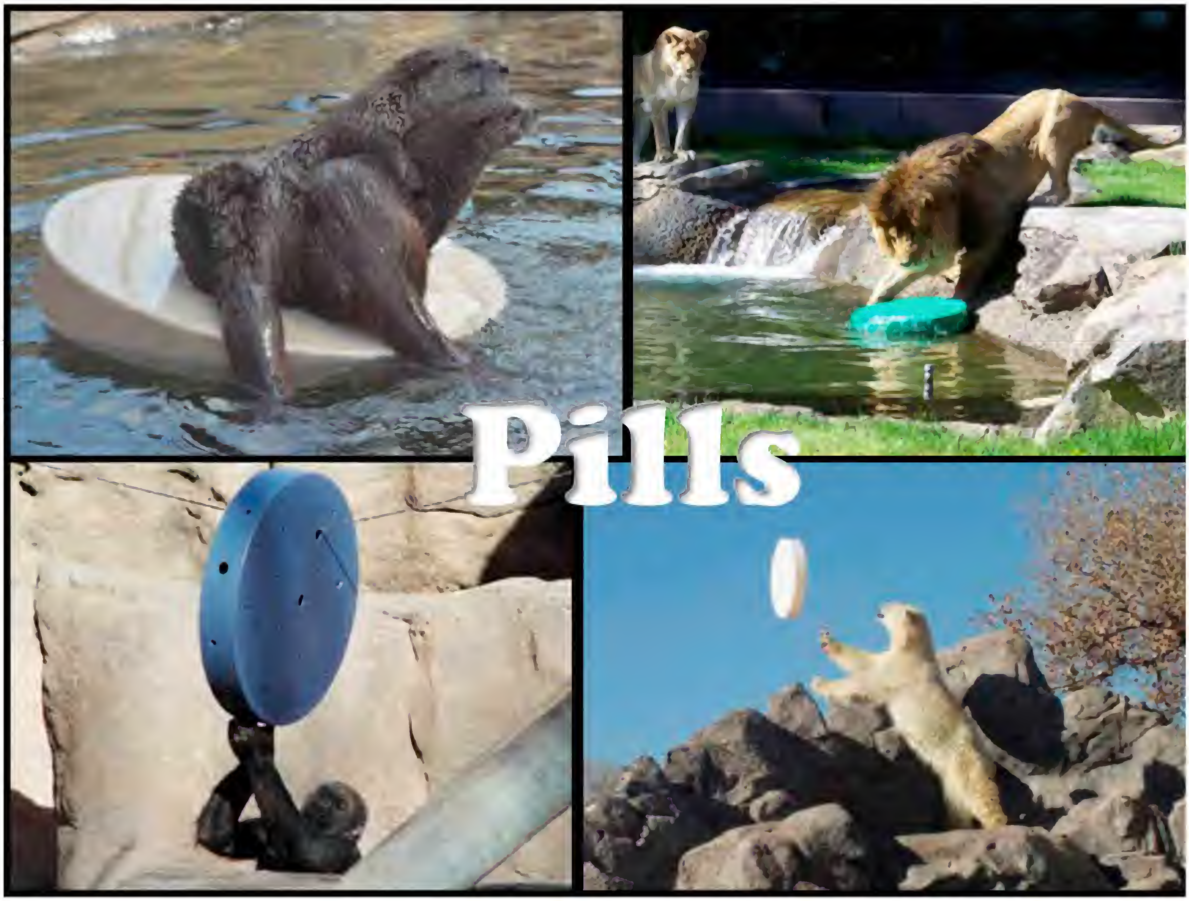
August 27-31, 2017
AAZK National Conference
Washington, D.C.

Hosted by the National Capital AAZK Chapter and Smithsonian's National Zoo

facebook.com/AAZK2017

October 4-5, 2017
Coraciiformes Husbandry Workshop
Nashville, TN
Hosted by Nashville Zoo at Grassmere
Facebook and Registration Page coming soon!

Pills



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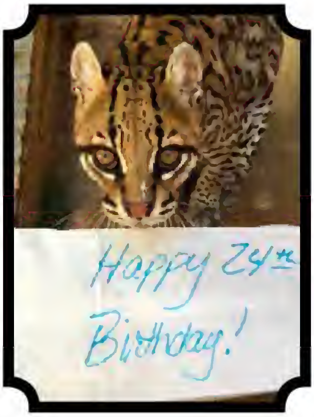
Golden Photo Contest

"Ewell", White-handed Gibbon. Photo by Michael Owyang, Sacramento Zoo.



"Fireball", Ocelot. Photo by Deidre Linden, ABQ Biopark Zoo

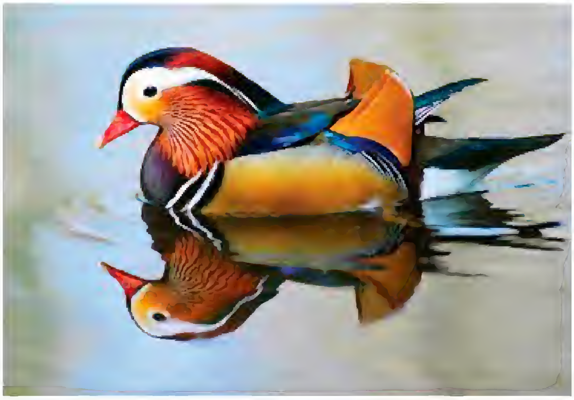
"Streep", Blue-eyed Black Lemur. Photo by Karen Caster, Little Rock Zoo

50 years
AMERICAN
ASSOCIATION
of ZOO KEEPERS
1967-2017

AAZK's 50th year as an Association is in 2017 and we will be celebrating all year long! Our Golden Anniversary includes the Golden Photo Contest for the covers of the *Animal Keeper's Forum,* with the winner announced on this month's cover. We were looking for photos of either golden animals in color or older animals that have lived at your zoo for many years and are charismatic favorites of regular visitors.

Congratulations to winner Amanda Westerlund of Pittsburgh Zoo & PPG Aquarium. Her winning photo is featured on this month's cover and Amanda receives $50 in AAZK merchandise. Runner-up photos may appear on AKF covers throughout the rest of the year as we continue to celebrate our 50th Anniversary. Some of the runner-up photos are featured above. The AAZK Board of Directors and Staff thanks all of the AAZK members who participated in the contest. Thank you for helping celebrate AAZK's anniversary, but also for sharing your stories about some very incredible "golden animals".

CALL FOR PAPERS!



Dedicated Issue on Waterfowl

Papers will be accepted on all topics related to waterfowl, including but not limited to advances in husbandry, behavioral management, conservation, reproduction, new trends and emerging topics affecting waterfowl.

For submission guidelines, to place an ad, or to sponsor the issue, please contact the AKF Editor Shane Good at shane.good@aazk.org.

Deadline to submit articles for this special dedicated issue is September 1, 2017.

ARC's Golden Trivia!

As you know, The American Association of Zoo Keepers was founded 50 years ago. *Who started the first chapter?*

Check next month's AKF for the answer!
ARC recommends you remember the answers for the 2017 National Conference in Washington, D.C. – there will be prizes!

Have you received the planning guide for National Zoo Keeper Week 2017? If you haven't, please email kristen.scaglione@aazk.org for your copy today!

Virginia Zoo brings animal care and training workshops to a critically important fauna region of the Philippines through a WAZA international training grant

Chelsea Hohlweg
Virginia Zoological Park
Norfolk, VA

Introduction

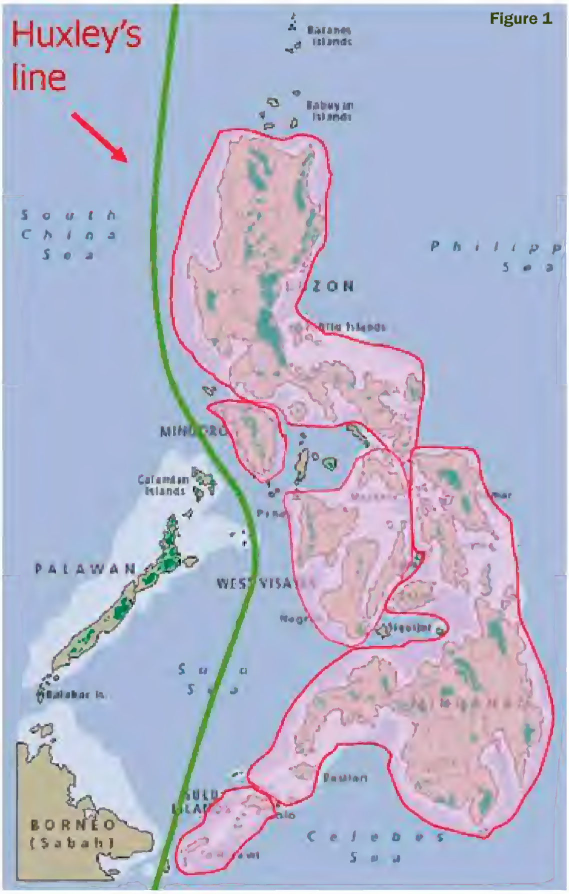
The Philippines have one of the most critically endangered fauna regions in the world and are in vital need of conservation assistance. Of the species inhabiting the area, 78% of them are found nowhere else in the world, ranking them first globally with the most critical and endangered endemic species. Unfortunately, many of their facilities lack knowledge in exhibit design, care, and training for captive species. Using a grant from the World Association of Zoos and Aquariums, the Virginia Zoo created a training program specifically targeted for leaders (managers, curators, veterinarians, and head zoo keepers) of facilities in the regions of Negros, Panay and Cebu Islands. Using knowledge gained from these workshops, the goal was for participants to then turn around and train their entire staff. This will improve husbandry practices and pass knowledge onto more people than could be trained during this brief visit.

In February 2016, a team from the Virginia Zoo traveled to the Philippines to conduct these training workshops. Over five days, participants received information on basic veterinary care, nutritional information, enrichment, animal training, exhibit design, capture and restraint, grant assistance, and development of action plans for each facility. Practical sessions were conducted for the participants to apply skills learned during the lectures. These workshops not only taught invaluable captive management skills but also served to bring various wildlife facilities together so they may form partnerships and reach out for assistance (e.g., grants, knowledge), from their US and international counterparts.

Philippines Background

Ask someone to tell you where the Philippines are located and they may be able to give you a vague answer of somewhere near Asia. Now ask that person, how many islands encompass the Philippines? Guaranteed they don't even come close. The Philippines is comprised of 7,107 islands which approximately total 300,000 square kilometers. With all of these individual islands, the biodiversity is extremely high, as well as the number of unique species endemic to only the Philippines. Sadly, there are also threats from factors such as deforestation, rapid human growth, agricultural encroachment, lack of protected areas, and lack of enforcement of areas currently under restoration. The nation is unique in that it contains five very separate faunal regions: 1) Greater Luzon, 2) Mindoro, 3) West Visayas, 4) Greater Mindanao and 5) the Sulu Islands. Each are separated by deep water channels, creating five distinct areas of endemism. Palawan, part of the Philippines politically but not regarded as a faunal region as it is separated by Huxley's Line, is a possible sixth region with its own faunal diversity correlating more closely to the Sudanic Region of Asia than to the Philippine Archipelago (see Figure 1.)

Figure 1



Having an area so secluded from any other land mass, it's no surprise that 78% of major species groups found on the islands are found nowhere else in the world. Chart 1 shows where the Philippines ranks in all of these areas compared to the rest of the world.

Of the avian species found in the Philippines, a vast majority of the species are either threatened or endangered due to the threats previously discussed as shown in Chart 2. In fact, the Philippines ranks extremely high in the world for most endemic avian species either threatened or endangered.

Chart 1

Taxon	Endemics	Rank (world)
Plants	6,091	9
Mammals	102+	5
Birds	234+	3?
Reptiles	160+	8
Amphibians	74+	11
Freshwater fish	67+	11
Tiger beetles	113+	3

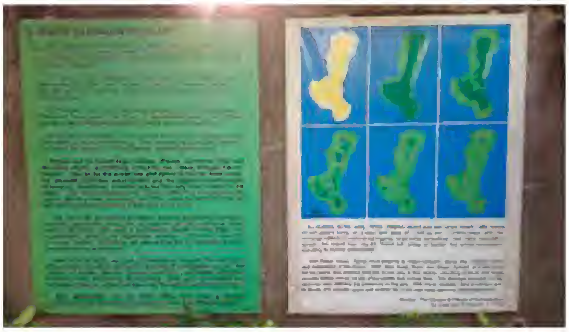
	Number of species				Rank with only:	
	Total	CR	EN	VU	CR+EN	CR+EN endemic
1. Indonesia	104	4	16	84	5=	6=
2. Brazil	103	16	31	56	1	2
3. Philippines	86	16	29	41	2	1
4. China	86	5	8	73	11	
5. India	71	4	9	58	12=	20=
6. Columbia	62	9	22	31	3	3
7. Peru	60	6	12	42	7	10
8. Ecuador	50	5	11	34	9=	13=
9. U.S.A.	46	13	12	21	4	4
10. Vietnam	45	7	9	29	8	16=

Chart 2

For example, the Philippines are home to the most critically endangered Hornbill species, the Sulu Hornbill (*Anthracoceros montani)* and the Rufous Headed Hornbill (*Aceros waldeni*). The Rufous Headed Hornbill was once found on three islands. Today it is only known to now exist on two islands, Panay and Negros. It is unknown how many currently live on the island of Negros, but less than 1,500 remain on the island of Panay. This is an increase from 60-80 breeding pairs in 2001. For the most critically endangered, the Sulu Hornbill, recent studies suggest there are less than 30 individuals left in the Philippines. And sadly, Hornbills are not the only species facing this decline. Every taxon has representatives on the endangered list. The world's most endangered crocodile, the Philippine freshwater Crocodile, faces similar challenges to the hornbills. The country is also home to the critically endangered Philippine Eagle, Tamaraw or dwarf water buffalo, Red-vented Cockatoo, and endangered Philippine spotted deer. Other notable species include the Island Flying Fox (a bat species), Clouded Rats, Visayan Warty Pigs, several Bleeding Heart Dove species, and the Visayan Leopard Cat.

The number one reason for the rapid decline in numbers for most of these species is habitat loss. In 1988, it was estimated that only 4% of Negros and 8% of Panay forests remained intact (see Image 1).

Image 1



With all of this biodiversity, why isn't there more of an effort to help save these species and assist in conservation efforts? Zoos in the Philippines have typically been private, for-profit attractions. The National Zoo is run by the City of Manila but otherwise the word 'zoo' generally refers to for-profit animal attractions. Detached from these facilities, there have long been wildlife centers attached to universities that have been operated for research/conservation purposes and are not commercially driven. These are usually universities with large Veterinary programs or which have a Wildlife Science focus. A few of these partnerships include Mari-it Conservation Park and Western Visayas State University in Panay, the Wildlife Center at the Center for Tropical Conservation Studies at Silliman University in Negros Oriental, and the Biodiversity Conservation Center in partnership with Negros Forests & Ecological Foundation Inc. (NFEFI) in Bacolod, Negros.

Meet the Partners

In April of 1990, the Philippines Biodiversity Conservation Programme, which later became known as the Philippines Biodiversity Conservation Foundation Inc. (PBCFI), was initiated to survey the field status of the Philippine Cloud Rat. Funded by a partnership with the Zoological Society of London, the organization quickly began to take on many of the challenges facing several other species in their country. Other institutions also began to assist in funding and conducting research in the area including Zoological Society of San Diego and the Zoological Society for the Conservation of Species and Populations (ZGAP). PBCFI set its main focus on "The long-term conservation of the Philippines' native and endemic wildlife and natural habitats for the benefit of future generations of all peoples who may inhabit and share the natural resources of the country." Today, with the local government's help (the Department of Environment and Natural Resources, DENR), they are doing vitally important work to help the many critically endangered species endemic to their country. The Foundation now operates in five (5) major regions of the Philippines and has more than eight (8) species conservation programs. In addition to in-situ research, PBCFI also manages two (2) conservation breeding centers.

Recognizing a need for further conservation assistance in the Philippines, the Virginia Zoo's Assistant Director, Roger Sweeney, submitted an application in 2015 for a training grant from the World Association of Zoos and Aquariums (WAZA) to work directly with PBCFI and the Provincial Government of Negros Occidental. Having previously worked with and become acquainted with many of the PBCFI employees, Assistant Director Sweeney knew how important it was for American zoos to assist in this critical region. The training grant is awarded to applicants every two years for programs that help build the capacity of zoos and aquariums in a developing country to improve their conservation and animal management programs.

Grant directive and mission

For the 2015 grant, the focus was on improving animal welfare practices in zoos and aquariums globally for things such as exhibit design, environmental enrichment, animal care, etc. Many of the priorities the grant required were right in line with what PBCFI and the Philippines institutions were seeking and what the Virginia Zoo could help provide. Those priorities were to:

- Build the capacity of a developing country's zoos and aquariums and their personnel to manage their collections and contribute to local, regional or global conservation
- Have a significant and quantifiable impact on the public or the local communities incorporated in the project
- Have a more applied research approach and emphasize basic principles of animal care and management or wildlife conservation rather than more technical research
- Are both scientifically and economically feasible in a designated period of time
- Are continuing rather than "one time" efforts; incorporate a strong educational and training component that can serve as a model for future programs.

Meet the Team

Once the grant was approved, work began on assembling materials to help educate, train, and assist the facilities that would be attending this workshop. Mr. Sweeney tapped the Virginia Zoo's veterinarian, Dr. Amanda Guthrie, and Chelsea Hohlweg, a full-time roving keeper, to assist in this undertaking. With the Virginia Zoo since 2012, Dr. Guthrie also has field work experience with a wide variety of species and has travelled abroad to work with sloths in Costa Rica and Asian Elephants in Thailand. Mrs. Hohlweg has been a full-time roving keeper with the Virginia Zoo since 2013 and has worked in the zoo community for over nine years. As a keeper, Mrs. Hohlweg has worked with a wide variety of species including many of the threatened or endangered species found in the Philippines that would be encountered during this workshop.

Workshop info

In February of 2016, the team from the Virginia Zoo traveled to the Philippines for a one week series of intensive workshops.

Upon arriving in Bacolod, the capitol city of Negros Occidental in the Philippines, the team visited PBCFI's main conservation breeding center, Negros Forests & Ecological Foundation Inc. - Biodiversity Conservation Centre (NFEFI-BCC), which also serves as a zoological park and training facility for keepers in the area. Attached are several photos from the facility where they specialize in caring for local species, many of which are severely threatened or endangered. Their goal is to reintroduce many of the animals back into their native habitats as forest reclamation efforts progress. Being located in the capitol city, visitor attendance is very high and therefore helps play an important role in generating conservation awareness among school children, indigenous people, and tourists. The facility currently houses:

Visayan Warty Pigs	28
Visayan Spotted Deer	several
Visayan Leopard Cats	6
Negros Bleeding Heart Doves	16 (including 3 breeding pairs)
Luzon Bleeding Heart Doves	1 breeding pair
Rufous Necked Hornbills	2 breeding pairs
Visayan Hornbills	3 breeding pairs
Mindanao Rufous Hornbills	2 females
Philippine Red-vented Cockatoos	1 breeding pair
Philippine Eagle Owls	17 (including at least 1 breeding pair)
Luzon Hawk Owls	2
Philippine Ducks	1 breeding pair
Southern Philippine Sailfin Lizards	Several pairs
Metallic Wood Pigeon	1
Pink-bellied Imperial Pigeons	1 pair
Philippine Hawk Eagles	1 pair
White-bellied Woodpecker	1

The high numbers of warty pig, bleeding heart doves and eagle owls are all the result of successful breeding programs. With all of their success, the center now faces the challenge of housing adults and offspring, making the need for reintroduction programs all the more important as captive numbers begin to rise. Space constraint is definitely one of the main issues faced by this facility. It was extremely eye-opening to see what four keepers could manage with the space and resources available.

Day 1 began with meetings with the provincial governor as well as provincial head veterinarian (see Image 2). When working in the Philippines, it is important to make sure you have the proper permissions, permits, and authority from partner organizations. This

Image 2

also provided an opportunity for PBCFI to show the interest from their international partners. Following the formal meetings, meet and greet sessions were held with all of the participants. PBCFI and the Virginia Zoo instructors gave introductions and briefly explained the agenda and goals for the upcoming days. Participants also were able to introduce the facilities they represented and the challenges they currently face. Many of the participants were local government veterinarians looking for more knowledge on care and husbandry practices for exotic species. Others were keepers/managers of local wildlife rehabilitation centers and conservation breeding facilities looking to gain more experience in basic husbandry and medical techniques. All of the participants were eager to make connections with one another for future partnerships and receive advice on requesting financial assistance.

The bulk of coursework began on Day 2. Lectures covering preventive health care programs, enrichment, and nutrition/food handling took up most of the morning. After lunch, participants were brought to NFEFI-BCC for a hands-on enrichment workshop. Using the lessons taught earlier in the day, we wanted to be sure they had comprehended the material. The group was divided into teams and each were given one species, found at the center, for which to create an enrichment item. The teams quickly went to work and were creating amazing enrichments using material the Virginia Zoo team had purchased the previous day and freshly harvested browse from the center. After the teams finished constructing their items and presented their ideas to the rest of the participants, the items were placed into exhibits for the animals at the center to enjoy. The groups then evaluated the effectiveness of their enrichment and reported their findings using techniques taught earlier in the day. It was wonderful to see everyone so excited about creating enrichment and realizing what a difference it could make in the lives of the animals in their care. (See images 3-7)

Day Three's lectures consisted of animal handling and restraint, identification and markings, record keeping, and animal learning and training. After lunch, the group enjoyed playing the Training Game to see if the concept of Animal Training had been comprehended. The bridge and reinforcement concept took a bit of time to understand but once they were given candy as reinforcement and able to work together as a larger group, things began clicking. The group then went to the breeding facility and took a few hours to watch their kitchen staff prepare meals. Participants were able to evaluate the techniques used and discuss what changes they could incorporate in their own facilities (See images 8-12).

Images 3-7

Images 8-12

On Day 4, the morning began with discussions on exhibit design, zoonotic disease, wildlife risk management, and stress management/ wildlife rescue. The latter topic was the most popular of the day due to the correlation with the types of facilities represented at the workshops. The participants explained that most of the animals they take in are rescued and that they were not always certain of the appropriate manner in which to handle the situations. After the lectures, they all felt much more confident having learned some of the best and safest practices to care for these animals when they enter their care. Many of the participants were also interested in learning what the ideal exhibit size should be for many of the species at their facilities. We listened to their stories and attempted to work through as many examples as possible. As this was also a holiday in their country, the workshop ended early to allow everyone time to celebrate. This extra time gave the team an opportunity to ask the keepers at NFEFI-BCC what some of their needs were and what additional resources we may be able to provide. Using money from the grant, the team headed to the local hardware store and mall to do a little shopping (every keepers dream!). (See images 13-15)

The final day of lectures focused on bringing the facilities together and helping them plan the next steps for their centers. Lectures consisted of grants and partnership opportunities both nationally and internationally, facility safety and contingency planning, captive wildlife laws, regulations and licensing, and regional synergy and resource sharing opportunities. Groups were asked to create a needs assessment by describing issues that their facilities were facing and brainstorming ways they could go about solving the issues, ways they could work together to solve the issues, and what steps they plan to take moving forward to solve their issues (see Image 16). Many believed making their governments more aware of their situations would be the most beneficial. Several government agencies came together to help promote these workshops and met with us during the course of the week. Hopefully, by seeing the involvement from their institutions, as well as those internationally, more emphasis will begin to be placed on conservation.

Follow-up

In the coming months, the Virginia Zoo and PBCFI will work together to follow-up with the participating facilities to see how they are implementing the lessons taught and if they have made progress in their work. A goal of this workshop was to not only teach the groups present at the lectures these valuable skills, but to have them return to their facilities to train their fellow keepers and staff on the topics discussed. The hope is that facilities will feel more comfortable working with each other to solve issues that may arise in the future and have a better understanding of how to care for these valuable animals in the best ways possible.

How AAZK and Zoos can help

All AAZK Chapters understand the importance of conservation and what it hopes to achieve: 'preserving species for years to come and keeping a healthy environment in balance.' AAZK and its Chapters have contributed millions of dollars over the years to different conservation efforts around the world which have helped countless species.

But more can be done. Donating money is a fantastic way to help contribute to the efforts of local organizations; however, as keepers, we possess valuable skills and knowledge that may be beneficial to local breeding centers and keepers in the field. Many of the species at the breeding centers are part of reintroduction programs or are used to educate visitors about the importance of saving their habitats. Having many resources at our fingertips, we are often very familiar with these situations and could lend a great deal of knowledge.

Image 13

Image 14

Image 15

Image 16

In addition to donating money, Chapters and zoos can look into working with worldwide Keeper Organizations (such as the Zookeepers Association of the Philippines), keeper development projects (including funding for AAZK Online), providing funds for exchange programs, or supporting efforts to fund a temporary keeper position for an externship. Many times, the US Dollar can go much farther abroad than it can within the States. Local development projects and grants, just like this workshop, not only teach invaluable captive management skills but, going forward, the wildlife facilities have the resources to work together and form partnerships both nationally and internationally, and reach out for assistance to help save the precious species found in their beautiful countries.

Resources

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Editor's Note: The Zookeepers Association of the Philippines and AAZK are both members of the International Congress of Zookeepers (ICZ). To learn more about how your Chapter can assist zoos and zookeepers in developing countries, contact AAZK's International Outreach Committee Chair Yvette Kemp at Yvette.Kemp@aazk.org.

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Weight Management in Animal Training:

Pitfalls, Ethical Considerations and Alternative Options

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Abstract: Weight management is a practice that has been used in training birds for many years. This strategy involves determining a weight range in which a bird may be more likely to respond to food as a reinforcer for training or maintaining behaviors. This is a strategy which is rarely used to train in other taxonomic groups. This paper will explore the pitfalls of relying on weight as a measure of motivation. This includes trainers becoming desensitized to bird body language indicative of excessive motivation for food reinforcers. It will also explore ways to measure motivation for food that are not related to the number on the scale. It will also question the ethics of using weight management in animal training and provide alternative options which are commonly used to train other species of animals.

Background

The International Association of Avian Trainers and Educators defines weight management as follows:

Weight Management

Because the weight and appetite of an animal are valuable indicators of its general health, monitoring a bird's weight can be a valuable tool in understanding its motivation to present a desired behavior as it relates to various weight ranges. Once a weight range that corresponds to acceptable behavioral responses to food is established, a diet is prepared to maintain the bird in that weight range. The weight range may be adjusted depending on response during training sessions. Various conditions may influence behavior, such as weather, age, food items, etc. and should be taken into consideration when evaluating weights and diets. These weight ranges may also vary between individuals of the same species. The goal is to maintain the highest weight possible and provide the greatest amount of food while maintaining the desired behavioral response. This practice is referred to as "weight management." (IAATE)

Capybara: Weighing to monitor health is recommended; and is different than micro-managing an animal's weight to create motivation for food. *Photo by Barbara Heidenreich.*

Weighing an animal to monitor for changes that may indicate health issues and also to maintain what is deemed a healthy weight for an animal (avoiding obesity, monitoring growth of young animals, etc.) are separate topics from weight management for creating motivation for food. While these are important tools in general health care, the focus of this paper is the use of weight management to facilitate animal training.

The weight management approach requires utilizing specific quantities of a diet to maintain the desired weight range. While this quantity may not represent a deficiency in food, in research settings it is generally termed a quantitative restrictive diet as opposed to an *ad libitum* diet in which the animal has free access to food at all times. It is also important to note that restrictive diets are not available to the animal at all times and therefore result in periods of deprivation. Deprivation is the term used to describe when something (in this case food) is not available; this does not necessarily mean that the diet is of insufficient quantity for the animal in training. These intervals in which food is not available are important to note as they can play a significant role in motivation for food reinforcers. Additionally note-worthy is that chronic deprivation has been shown to have a much greater influence on feeding motivation than acute sudden deprivation (D'Eath, Tolkamp, Kyriazakis, 2009) which will be discussed more later.

Hunger and Motivation

In animal training, words like hunger and motivation are easily interchanged. However, in reality hunger and motivation are two different discussion items. Hunger is not well defined in literature. It is generally agreed to be a negative subjective state. One from which animals will work to obtain relief. Inspired by the Brambell report, the first of The Five Freedoms by The Farm Animal Welfare Council states that animals should have Freedom from Hunger and Thirst - by ready access to fresh water and a diet to maintain full health and vigor. (The Farm Animal Welfare Council)

In the lab setting hunger can be measured as a metabolic state. This requires sampling not practical in the real world of animal training. Hunger is also sometimes measured by a change in "normal" expression of non-feeding oral activities such as redirected pecking in chickens and stereotypy. Also measured in chickens is drinker use (pecking at water and water consumption). Other behavioral measures include how quickly the animal eats, presentation of compensatory feeding behaviors, and activity levels. Operant responding is also used as a measure, usually comparing how the animal responds to a task soon after a meal and then again at various intervals later (D'Eath, Tolkamp, Kyriazakis, 2009) This can include measuring the force of the response, response latency and relative frequency of responses (Cooper et al., 2007).

Observed Behaviors	Level of motivation
Holds pine nut in foot	Low
Bites tiny pieces off of pine nut slowly	Low
Drops half of the nut	Low
Wipes beak on perch (feaking observed)	Low
Proceeds to preen after drops nut	Low
Holds pine nut in foot and brings to mouth quickly	Medium
Quickly breaks nut into 2-3 pieces and swallow pieces	Medium
Directs attention back to trainer once nut is consumed	Medium
Swallows nut immediately without breaking into pieces	High
Quickly directs attention to trainer once nut is consumed	High
Offers trained behaviors in rapid succession	High
Presents behaviors equated with frustration or anxiety about food: may redirect aggressive behavior on nearby objects, birds, or people, stereotypic pacing, etc.	Excessive
Aggressive behavior presented towards other birds if competing for the same food resource	Excessive

Table 1

Animal trainers who look at behavioral response as a means of measure of hunger typically rely on the operant response strategy, looking at an animal's body language and species-typical behavior with food. *For example, when a pine nut is offered to a macaw in a training scenario in which the bird is relaxed and comfortable and being asked to do nothing but accept food or perhaps present an easy to accomplish behavior that has been trained to fluency, the following observations could be used to rate hunger* (See Table 1. Heidenreich, 2012).

In other words, there are observable behaviors that animal trainers can use to rate hunger. These observable behaviors will vary with species, for example a hawk may show behavioral responses that are different from a parrot. Although a potentially daunting task, animal training would benefit from clear definitions of measures of hunger, especially since food is commonly used as a reinforcer for behavior. The five freedoms state that animals should have freedom from hunger. In the animal training world this leads to questions such as "at all times?" and is "any level of hunger acceptable?" Having measures of hunger and identifying ranges that are acceptable and not acceptable by the animal training industry, and why, gives animal trainers a guideline or at least a starting point to better evaluate hunger based on behavioral observations. This may in the future help address the questions raised by the first of The Five Freedoms. But more importantly it can potentially lead to improved welfare in animal training by helping trainers recognize when hunger is exceeding acceptable standards. It can also help provide an honest interpretation

Trained macaw flock. Avian Behavior International free flies flocks of macaws and birds of prey without the use of weight management, challenging the traditional free flight training methodologies using progressive approaches that ensure high standards of animal welfare for free flying birds in educational presentations. *Photo by Barbara Heidenreich.*

if assumptions are being made that an animal is hungry or must be hungry, for example due to a late feed.

Motivation to present behavior is much broader than hunger. Animals present behaviors for many different types of reinforcers. Extinction procedures can cause vigorous presentation of behavior. Different schedules of reinforcement can allow numerous or extended presentations of behavior before reinforcers are delivered. Some humans present food acquisition behavior in the absence of hunger and it is also observed in animals as well, particularly those that cache food. This is a just a short list of items to consider when evaluating motivation. Acknowledging that hunger is one category of motivation is important because it allows trainers other options for acquiring behavior that do not rely solely upon hunger.

Pitfalls and Ethical Considerations

In the definition for weight management, a weight range is identified as that which corresponds to an acceptable response for food. This may appear to be another means to measure hunger. However, in practical application what is often observed is a fixation on maintaining the bird's weight in the identified range as opposed to evaluating hunger based on behavioral response. This results in other observable behavior or physical manifestations that could be indicative of an inadequate quantitative restrictive diet. The following are observations that may signal the weight management strategy is poor and is not adequately addressing the needs of the animal.

Frantic or Anxious Behavior

Animals may show frantic behavior in the presence of food, when eating or when a stimulus is presented that is a potential indicator of food. Trainers may become desensitized to this response and consider it a "normal" hunger response or level of motivation for food. For example, pigeons used in a behavioral analysis lab were weighed daily and fed a quantitative restricted diet by the lab students. The students were instructed to feed specific amounts based on the weights of the animals. The pigeons thrust themselves against the front of the cage when students were preparing to deliver food. When offered food, it was consumed very rapidly. Once fed, the animals sat calmly. However, if the students reached or walked towards the food bin the pigeons would immediately throw themselves against the front of the cage again. On a side note, bright green fecal matter was also observed which is typically indicative of compromised health/welfare in pigeons due to lack of food. Behavioral and physical data were not being properly evaluated and considered in this weight management situation.

It has been demonstrated that appetitive food cues presented to organisms in a high drive state when actual consumption is not possible promote a state of frustrative nonreward. Researchers have emphasized the aversive nature of nonreward in deprived animals. Furthermore when food is withheld, food cues potentiate the probe startle response. The enhanced startle response for food-deprived subjects suggests that, to some extent, food cues elicited an aversive motivational reaction. Frustration generally involves heightened anxious arousal; hence, negative affect. The reports of greater arousal and loss of control from food-deprived subjects are consistent with this interpretation. There is also evidence that food-deprived rats, given food cues separately from feeding, also show decreased pleasure as a function of hunger. (Drobes et al., 1993)

Water gorging/Food related stereotypies

Studies show that rats drink more water when food deprived (Morrison, 1968). There is also evidence that overdrinking can be a stress related behavior (D'Eath, Tolkamp, Kyriazakis, 2009). Birds that are food deprived may show increased drinking of water (Savory et al., 1992). Broiler hens that are food restricted and allowed access to *ad lib* water can overdrink water. Because of this water can be provided for a few hours per day, but it can exacerbate the frustration caused by food restriction (Mench, 2002). Rushen (1984) suggests that the occurrence of adjunctive drinking by sows results from the persistence of feeding motivation, perhaps because concentrated food does not provide sufficient stomach distension, combined with the knowledge that food will definitely not be forthcoming. Stereotyped sequences of behavior may be a means of reducing the arousal generated by the expectation of food (Rushen, 1984). Birds, especially those known to eat several times a day or throughout the day have been observed water gorging in show settings. Water gorging should be considered an indicator that the feeding strategies are either inadequate in quantity and/or frequency. This can also result from long-term chronic quantitative restricted feeding.

Stunted growth

In the poultry industry breeder broiler chickens are selectively bred to grow quickly. When these birds are fed *ad libitum* this results in extremely overweight birds with a myriad of physical problems. To address this many breeder broiler hens are intentionally placed on quantitative restrictive diets to stunt growth (Vakali and Akbarogli, 2013). Stunted growth has been observed in macaques on restrictive diets when young. Researchers are advised to ensure sufficient food is provided to maintain normal growth rates whilst continuing to perform the behavioral tasks effectively in research settings (Prescott et al., 2010). Stunted growth is also used as a measure of poverty and malnutrition as a result of inadequate feeding in humans (Reinhard and Wijayaratne, 2002). Unfortunately, stunted growth has also been observed in birds in bird shows, especially those that have been placed on quantitative restrictive diets during their first year.

Persistent juvenile behaviors
A phenomenon that has been observed in some species of birds that are entered into a quantitative restricted diet during development is the persistence of juvenile behaviors into adulthood. In pscittacines this results in the observation of head bobbing behaviors, vocalizations associated with food begging and head feather erection similar to what is seen in fledgling-aged and younger parrots. In parrots that remain on a quantitative restricted diet, as is done in weight management, these behaviors persist for many years into adulthood. It is possible these behaviors also remain due to reinforcement history, and/or imprinting on humans, however they have also been observed to go away if the bird is allowed access to an *ad libitum* diet for an extended period of time. This persistent presentation of juvenile behaviors when on quantitative restrictive diets has been also observed in ground hornbills, vulture species, ibis species, crows and ravens. A reverting to juvenile behavior has also been observed in parent-raised hawks when placed on a very restricted diet.

Other possible health issues
It is difficult to thoroughly ascertain all the possible impacts short-term and long-term quantitative restrictive diets can have on animals being trained via this approach. Adequate nutrition and caloric intake affects numerous functions including feather production, bone density and brain chemistry. Some speculations have arisen in regard to a correlation between quantitative restrictive diets and feather damaging behavior observed in hawks that is initiated when placed on restrictive diets, noting the behavior was absent on an ad libitum diet. Van Krimpen (2008) also found that increasing behavior related to feeding and satiety by dietary changes successfully reduced feather pecking behavior in chickens. It is possible future exploration into the topic will reveal more correlations between health issues and long-term restrictive diets.

Other fallout
An unfortunate observation is that weight management has been presented to the companion parrot community several times as a solution to creating motivation in pet parrots. Most trainers would agree that the application of weight management strategies is something that should be learned under the guidance of an experienced professional. This cautionary approach is to avoid many of the examples of poor application previously mentioned. It is also to help determine if indeed weight management would facilitate creating motivation for food. This leads to the question is weight management appropriate or even necessary in the companion bird world? The species of birds most commonly kept as companion animals typically include species whose natural history allows for a large diversity of potential reinforcers (social interactions, allopreening, enrichment, etc.). Additionally, many include feeding and foraging strategies that respond extremely well to food management to create motivation for food. Food management is defined by The International Association of Avian Trainers and Educators as managing when and how food is delivered, what food items are offered, and the ratio of food items offered to create desire to present behaviors for food reinforcers (IAATE). Micromanaging weights and diets for these species is typically not necessary and can put companion animals at risk due to improper guidance.

Psychological Appetite

The previous examples illustrated what can happen when focus is primarily on keeping a bird within a certain weight range. Often the recommended objective is to work the bird at the highest weight possible. An example often used to suggest successful application of weight management is when the animal's working weight is higher than what it would be if fed *ad libitum*. This motivation to present behavior in this situation has gone by several names, including psychological appetite, psychological hunger, and most recently food paradox in certain bird training circles.

Malina (2003) states psychological appetite is the creation of a perceived feeling that there is a food shortage. The result is that the bird is more likely to be motivated to take advantage of the opportunity to obtain a food item. Psychological appetite is produced through creating a perceived food shortage based on how the food is presented. And, when combined with variable reinforcers and small windows of opportunity, psychological appetite provides increased motivation without having to reduce an animal's body weight. As the bird's weight continues to increase, the bird is working on habit and *psychological* appetite. If something causes the bird to fly off and sit in a tree, it may stay out longer if it feels there is no real drive to satiate its appetite. As you can see, while weight management is a factor in creating psychological appetite, once created, that psychological appetite can allow you to successfully work your birds at or above their ad-lib weights (Malina, 2003)

There are several challenges with this interpretation. Psychological appetite suggests an animal is not experiencing hunger. It also suggests that weight is linearly related to hunger, and that an animal is not experiencing hunger at a higher weight, all implying good animal welfare. However, as has been demonstrated, hunger is not the same as motivation and different measures need to be applied to ascertain if the animal is experiencing hunger. Additionally, animals can and do experience hunger despite higher weights. A fact certainly not lost on an overweight person attempting to lose weight, or an overweight animal that didn't receive its anticipated meal. In addition, other factors can influence hunger that are not related to weight, such as time elapsed since the last meal was consumed. So while an animal may have a higher weight, it may very well be experiencing hunger.

Another aspect of this training strategy that poses welfare questions is the perceived shortage of food. Psychological appetite is comparable to food hoarding/food maintenance behavior seen in humans and also rats. When humans are deprived of food, they have a very predictable response: they become obsessed with seeking food. This has been shown in studies of people deprived of food throughout history, for example, children adopted from food insecure areas, survivors of concentration camps, prisoners of war, or people lost in the wilderness after accidents. Mildly or moderately food deprived children will

exhibit this behavior problem as a response to a time or times in their life when they didn't have enough to eat, and could never be sure when their next meal would occur. The inconsistent availability of food can lead to behaviors like overeating and secretly hoarding food when it does become available. While this may make sense in a food-insecure situation, many children continue this behavior even when they are in a safe environment with plenty to eat. They will binge eat when food is available and store food for later, often making themselves sick because their bodies are not used to so much food (Schnell, 2013; Taylor, 2013). Rats also hoard food or eat too much after starved for long periods of time. Rodents are not gastro intestinally suited to true binge eating comparable to that of humans but those on calorie restriction pack in as much as they can when food is available. If experimental protocols permit, they also stash whatever they can carry. In rats, perhaps the most basic indicator of the proposition that calorie restricted animals 'feel hungry' is that—given the opportunity—they all eat substantially more than they are allocated on other feeding regimens (Vitousek et al., 2004).

Some parallels we observe is that even birds working above *ad libitum* weight and perceived to be responding due to psychological hunger are often obsessed with food acquisition, anxiety before feeding times, gorging when food is available, and overeating until sick when put on feed up or free feed. These are especially prevalent on animals that have been exposed to restricted diets for long periods of time. The Society for Neuroscience has adopted the US Public Health Service Policy on Humane Care and Use of Laboratory Animals (2002), which recommends that unless the contrary is established researchers should consider that procedures that cause pain or distress in humans may cause pain or distress in other animals (Prescott et al., 2010).

While a perceived food shortage may allow a bird to have motivation at a higher weight, it raises the question is this an acceptable psychological state for birds in an animal training program?

A frequently presented argument is that psychological appetite replicates a natural occurrence in the wild. Animals don't always have food available and must seize opportunities when they arise. The crucial difference is that animals in the wild have the opportunity to seek food. Animals that do not have food seeking opportunities and are on restricted diets have been shown to have an increase in presentation of food/oral related behaviors such as repeated pecking at water in chickens that can develop into stereotypies (Lawrence et al., 1993). Stereotypy is highly prevalent in captive domestic pigs. In large commercial production systems, pigs have minimal complexity in their housing systems. The combination of a frustrated feeding motivation combined with a lack of foraging opportunities highly impacts this problem (McCormick and Donaldson, 2013).

Animal trainers often speak of choice in animal training, but are weight managed animals really at liberty to choose when to seek/acquire food? Having no control of the opportunity to acquire food except under very limited conditions is not analogous to an animal that may be food deprived but has the opportunity to behave to potentially acquire food. Also, in the wild food can be abundant for prolonged periods of times. It is usually not chronically restricted to limited quantities creating long-term deprivation as opposed to acute deprivation. Although still diminished compared to the wild, it is possible that some birds such as those flown in falconry, or presentations that allows more unstructured flying, with a large variety of generalized behaviors may be experiencing better opportunity to express seeking behavior than a bird flying consistently patterned A to B's.

Another explanation sometimes presented for the response of a weight managed bird presenting behavior at a high weight is contrafreeloading. Contrafreeloading says that animals will expend energy to forage even when food is readily available. Some trainers and researchers interpret this as the animal wants to use its adaptations to acquire food. A key factor in contrafreeloading is that the animal is exploring *other* opportunities to acquire food while at the same time comparable food is available and easily accessed. Additionally, some researchers believe contrafreeloading may not be about the reinforcing qualities of doing behavior, but about the information that is acquired by doing the behavior. Information that leads to future resources is reinforcing. It has also been observed that contrafreeloading is relatively decreased when animals are hungry. (Bean, Mason, Bateson, 1999) Instead they go directly to the known food source.

Relief Response Vs. Behavioral Bliss

Observant animal trainers have noticed a difference in the way birds behave when presenting an action for food reinforcers in which motivation is created with different approaches. A behavioral bliss point occurs when an animal is given free access to alternative activities and will behave in a way to maximize its reinforcement (Allison, 1983) Birds that are trained with a behavioral bliss approach tend to show relaxed behavior in the presence of food. It appears they understand reinforcers are forth-coming. They do not experience deprivation to the point that they are either physically or psychologically concerned about food. They will take food when offered, but do not appear anxious or concerned about food. In contrast, those trained with a weight management approach exhibit much more focus on food acquisition. This may be because the animal is either hungry or not sure when the next meal is coming, and is therefore eager to eat when food is available. Animals in both conditions will perform behavior for food. But the body language of those birds will look quite different. This is because the motivating operations are different. The weight managed animal is seeking relief from hunger or a perceived food shortage, while the other is seeking the pleasure of the desired consequence. It is important to recognize there is a difference in these establishing operations and the difference has welfare implications.

Discussion

In research settings utilizing primates the primary animal welfare concerns associated with the use of food control protocols are: (i) the risk of nutritional imbalances, depending on the reward type and diet used; (ii) the potential for weight loss (or poor growth, in the case of growing animals) from programmed or non-programmed restriction; and (iii) the aversive experience of hunger (Prescott et al., 2010).

As discussed, weight management in bird training can impact animal welfare when applied poorly. This can include excessive hunger, stunted growth, water gorging/food seeking stereotypies, persistent juvenile behaviors and possibly other potential health problems. Weight management when applied properly may create a psychological state that also has poor welfare implications. While weight management can create the desired motivation for animals to present behavior (when applied well or poorly) the question becomes is it an ethically appropriate tool in animal training?

In the bird training world weight management has a long history of use; unfortunately this long-term use doesn't necessarily equal best practices. The animal training industry has made tremendous changes in its approach to influencing behavior in the last 50 years. Many trainers have embraced force free science-based training technology. Bird shows are removing equipment from raptors and free lofting birds as much as possible. And birds are being trained to do behaviors once thought impossible such as allowing blood draws and injections without restraint. Approaches in animal training are evolving and traditional practices are being questioned. Exploring alternatives to the use of weight management as a primary means of creating/measuring motivation for food needs to be a part of this evolution.

Many trainers already incorporate strategies that reduce or eliminate the need for weight management to create motivation for food. For example, animals can be trained immediately preceding normal meal times, meal times can be staggered throughout the day to increase training opportunities, base diets can be provided at all times while preferred foods are saved for reinforcers to be offered during training, reinforcement schemes in which less preferred reinforcers are offered first and most preferred last, small pieces of food can be offered to allow for more repetitions before satiation, and/or the animals' regular diet can be offered during training only. If any reduction in food provided is considered at all, the period is short lived. Once the learning has occurred, diets are quickly returned to levels considered typical for the animal. There are many examples in which the listed strategies for managing the delivery of food have proven to be successful in creating motivation for food reinforcers without compromising the health and welfare of the animal (Heidenreich, 2012). These strategies have been used for birds in both free flighted/free roaming situations and/or more controlled environments. It is also interesting to note that weight management as a means of creating motivation for food is predominantly seen in bird training (primarily bird shows and falconry) and in some research settings. It is rarely used to train other taxonomic groups.

Bird training also needs to consider the role of nonfood reinforcers in animal training. This also leads to the opportunity to include a variety of reinforcers as a means of increasing motivation. Atlantic bottlenose dolphin trainers at the Aquarium of Niagara Falls documented a significant increase in consistent performance of behavior when they introduced a variety of nonfood reinforcers into their repertoire (Ramirez, 1999). Many species in bird shows are social, engage with enrichment readily, respond favorably to touch, forage frequently, cache, respond to sights, sounds, movement, etc. For example, a male satin bower bird on exhibit was easily reinforced for behavior by offering blue items that could be used to decorate his bower (See video clip here http://www.youtube.com/watch?v=NaziP8mtqO4&list=PL535EQukKq4r-A0TuHXvtp7CXkQHI6TGK&feature=share&index=10). Pscittacines in particular can easily be successfully trained without the use of weight management due the long list of nonfood reinforcers to which they often respond.

In addition, many marine mammal presentations consider the use of other schedules of reinforcement (besides an FR1) much more in their training strategy in comparison to bird shows. The typical marine mammal presentation typically has a limited number of animals to present a 20 to 30-minute show. This means a single animal may be required to present a variety of behaviors over a longer duration than most birds in bird shows. Different schedules of reinforcement can add unpredictability, and when applied properly can increase motivation. The combination of a variety of food and nonfood reinforcers and different schedules of reinforcement can contribute to an animal that is engaged in training for a longer duration.

The animals also typically know a variety of behaviors and may not know which behavior will be asked next. This approach is different from many bird shows in which animals are presenting the same behavior or repeated flight patterns each show, with a predictable reinforcer waiting at the end. Malina (2003) states in her description of psychological appetite, as the bird's weight continues to increase, the bird is working on habit and *psychological* appetite. If something causes the bird to fly off and sit in a tree, it may stay out longer if it feels there is no real drive to satiate its appetite. It is easy to see if a bird is trained to present a patterned behavior with a predictable reinforcer, that if it were to stray from its consistent path it might be difficult to regain its attention and focus without the use of elevated hunger. However, with training strategies that include generalized behaviors, a variety of reinforcers, different schedules of reinforcement, and a variety of trained behaviors that are requested unpredictably, it is possible that bird training for shows could reconsider the need for weight management as a means of creating motivation.

It is interesting to note that most bird training begins without the scale. If a bird has no training history and no identifiable nonfood reinforcers, many trainers begin by offering food and evaluating motivation for food by observing behavioral response. Some trainers advocate getting a bird trained to stand on a scale as soon as possible and focus on a weight management approach. However, this can cause focusing on weight to become the priority. While acquiring the weight might be helpful for monitoring health, encouraging trainers to continue to place emphasis on behavioral response and incorporating food management strategies can support a move away from weight management. This is also when having industry guidelines of observable measures of hunger and acceptable parameters would be helpful. It is in the best interest of the animals and the industry to teach trainers how to better evaluate and rate hunger using observational skills as opposed to the number on the scale.

Examples

The following are examples of bird training that have been successfully implemented that do not use weight management as a means of creating or determining motivation.

Free Flighted Flock of Cockatoos

Chris Shank of Cockatoo Downs maintains a flock of small cockatoos. Some of the flock members are parent-raised and some are hand-raised. The birds live in large outdoor aviaries attached to a barn. Chris has had many training sessions with some individuals in the flock and the birds have history of receiving sunflower seeds or pine nuts from her if cued for behavior. The birds have access to food in their cages at all times. The birds are also released almost daily and free fly on the property throughout the day. The birds forage on grass shoots and fruiting trees. The ones with training history will recall to Chris reliably when cued and participate in training sessions. In the afternoon they return to the aviaries where a fresh diet is waiting. There is an important difference in this training setting compared to bird shows that involve very short, predictable patterned flights or behaviors. The birds have and do spend considerable amounts of time in the environment and their behavior, in particular recall, is extremely generalized with a long history of reinforcement under many conditions. This strategy combined with management of preferred reinforcers allows these birds to feed *ad libitum* and still have motivation to present behavior. See video example: http://www.youtube.com/watch?v=HGF_KDV1kpY

Free flying cockatoos at Cockatoo Downs can be out for hours foraging, yet respond to cues for behaviors thanks to strong reinforcement history for behaviors and working for preferred reinforcers. *Photo by Barbara Heidenreich.*

Keas will present many repetitions of behaviors for cognitive research studies without the need for weight management at the University of Vienna in Austria. *Photo by Barbara Heidenreich*.

Wild Pigeons

Wild pigeons are fed on a daily basis around 2 PM in a park. The pigeons receive preferred food items from several individuals in the park. Individual pigeons are recognizable by the people who feed the birds. The author visited the park and was able to train several birds to present a variety of behaviors in a short time using preferred reinforcers. Two of the pigeons were hand-raised and released by one of the individuals who visits the park. Although usually associated with the flock, these pigeons often fly directly to him upon sight and will follow him back to his apartment. Being wild pigeons they are free to leave or forage elsewhere. However, the easily acquired preferred food items keep them returning on a daily basis. See video example: http://www.youtube.com/watch?v=t5gGBI6OhkY

Ravens and Keas in Research Setting

Ravens and keas utilized in cognition studies at the University of Vienna in Austria are fed preferred food items when participating in experiments. The keas are fed a base diet of items which include fruits, vegetables and proteins (varying daily e.g. yogurt and topfen (Austrian dairy product), corn, eggs or mashed meat) three times a day. Training for research projects is conducted in between mealtimes in the morning and the afternoon. The ravens are fed a base diet in the morning prior to training for research projects. They receive nuts, cheese and dog food throughout the day for participating in the research study. They are then fed the rest of their base diet at the end of the day. Birds are weighed occasionally to monitor health as opposed to measuring weight for motivation for training (Schiestl and Bugnyar, 2014).

Free Flying Parrots, Cranes and Hornbill

Pscittacines, crowned cranes, and a ground hornbill are free flown successfully without the use of weight management at Avian Behavior International. Animals receive portions of their diet throughout the day, and are reinforced with preferred food items, and nonfood reinforcers. Similar to the example at Cockatoo Downs, the birds are trained to generalize behaviors under a variety of conditions and environments. Animals are free to explore the environment, but are motivated to respond to cued behavior when the opportunity presents itself. Motivation for training is based on behavioral responses and weights are only measured to monitor health (Hankey, 2013). See video examples http://www.youtube.com/watch?v=KUhloUa6VT0 and http://www.youtube.com/watch?v=49pF_LXpenI

Free Flying Caracara in Zoo

A striated caracara at ZSL (London Zoo) was trained during the non-show season when on feed up. Trainers found the bird would present behavior even though it was 200g over its target weight. They utilized strategies such as only having the bird participate in educational presentations three days a week, managing food, and using nonfood reinforcers such as novel enrichment and caching opportunities (Habben, 2008).

Macaw Flock in Zoo

A flock of eight scarlet macaws at the Dallas World Aquarium was trained by the author to present a flock flight several times a day without the use of weight management. The birds received a portion of their base diet which included pellets and fruits and vegetables in the morning. Approximately one to two hours later they participated in a training session in which flight behaviors were reinforced with seeds and nuts. They were then offered free access to their base diet and allowed to feed until satiated. Leftovers were removed and a second training session occurred later in the day. At the end of the day they were again allowed free access to their base diet for several hours. When the birds had gone to roost any left-over food was removed. Birds were weighed periodically to monitor health but were not weighed to identify a target weight for training or measure motivation.

Free Roaming Parrot in Conservation Project

Sirocco the kakapo is an imprinted endangered parrot that lives freely on a 310 ha island in New Zealand. Sirocco is free to consume normal vegetation available on the island at all

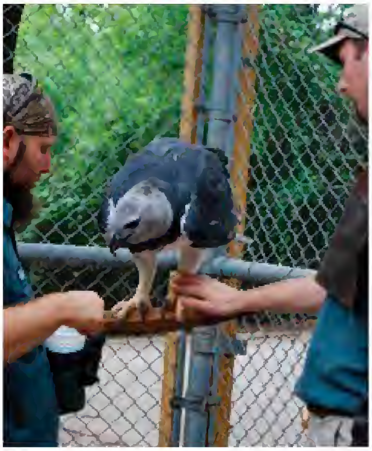
Eagle owl photo by Barbara Heidenreich

Viral video star Sirocco the kakapo roams freely on Maud Island in New Zealand. His training required creative use of a variety of reinforcers including preferred food items and non-food items. *Photo by Barbara Heidenreich.*

times. Training Sirocco required rangers to track him using a telemetry device as he could be anywhere on the island. Once roughly located rangers would wait on the pathway for Sirocco to approach. Sirocco's affinity for people and their history of being associated with desired consequences resulted in Sirocco seeking out the rangers once he heard their voices. Sirocco would participate in training sessions for as long as two hours working primarily for small preferred food items not available in the environment and social interaction. (Heidenreich, 2012) See video example: http://www.youtube.com/watch?v=9rgs72Jldx4

Exhibit Harpy Eagle in Zoo

A harpy eagle at the Dallas Zoo was trained without the use of weight management. Initial training began from outside of the enclosure. The bird was trained to target, and fly from point A to point B for keeper presentations inside the exhibit. The bird was also trained to shift into its cold weather holding area and also to enter a crate. The bird was trained to get on a scale although this was used to monitor health, not motivation. Interest in food was evaluated by looking at behavioral response. The bird was also trained to allow touch to the chest and legs, the application of removable anklets and jesses, and to hop to a glove. (Heidenreich, Corredor, Compton, 2010) See video example: http://www.youtube.com/watch?v=IeP1CBrkJtc



Caption: A female harpy eagle was trained by evaluating her behavioral response to food as opposed to concentrating on numbers on the scale to determine motivation for food.
Photo by Barbara Heidenreich.

There is much more to explore and discuss about the ways people are successfully training birds in free flight/free roaming and enclosed settings without the use of weight management. Of particular interest would be to explore the application of different strategies with a wide range of species. Bird collections often present a great diversity in avian natural history and some strategies may prove to more successful with some species than others. Only a few examples have been shared here, however it is hoped that more trainers will document and share their strategies to facilitate continued advances in bird training.

Conclusion

Training birds involves the use of many different strategies to influence motivation. Skilled trainers are drawing upon all those tools (reinforcement history, schedules of reinforcement, variety in reinforcers, awareness of environment and its effect on behavior, food management, etc.). Weight management for many has been a part of this toolbox. In some cases it has been the primary tool. However, when scrutinized, weight management presents questions about welfare. More and more people are demonstrating birds can be trained without micromanaging diets and weights. Their successes open the door to strategies that allow reaching behavior goals and at the same time attending to high standards of animal welfare. These revelations suggest perhaps it is time to stop putting so much weight on the scale.

To see a video presentation of this article, visit this link http://animaltrainingfundamentals.com/weight-management-in-animal-training-pitfalls-ethical-considerations-and-alternative-options/

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Comments from the Animal Welfare Committee

Thanks Barbara for the well-written and researched article. It is a great topic to kick off the new AAZK Animal Welfare Column as it covers a complex and potentially controversial topic in depth and with supporting references. While this topic is well known in the avian field, keepers working with other taxa may not be as familiar with the topic or its history. In addition, many other taxa may have additional factors when considering this topic – for example significant seasonal fluctuations in appetite and weight in some species, additional weight and food requirements by reproductive females or males in season, and more.

Using hunger as defined by motivation in training scenarios to make decisions about an animal's diet can present many challenges, ethical concerns, and have long-term implications as defined by this author. On the other hand, not all animals should be fed ad-lib; Ad-lib access to food is not a natural state for most species and can lead to other challenges, ethical concerns, and have long-term health implications. Many of us know animals who are overweight but always eager, or even ravenous, to eat and always seem to want more despite the need to curb their intake for overall health reasons. Then there are other animals who are slow, maybe even "fussy" eaters that might even benefit from a little more caloric intake. These animals just refuse to eat more despite the determined keeper's best effort to offer a variety of gourmet options presented in the most appealing way possible (every cheetah keeper knows to fluff the meat into a tasty mound right in the center of the bowl, then sprinkle with beef blood and then…….).

Couple key notes to think (and talk) about from this conversation are:

- Motivation is more than hunger.
    - Motivation can exist without hunger.
        - What types of motivation work for the animals you have worked with?
- There is a difference between weight management and food management:
    - Weight management: Diet and nutrition decisions should be made with the input of veterinarians and nutritionists and should be based on an animal's health, welfare, natural history, and data/resources.
        - How do you make decisions about animal diets, who is involved, what resources are used? When was the last time you evaluated it in the context of health and current standards?
    - Food Management: How that nutritionally balanced healthy diet is offered can be part of a behavioral husbandry program – used in training, used in enrichment, used in management – to promote natural behaviors, to encourage appropriate activity levels, to build positive relationships with staff, to train behaviors, to facilitate husbandry needs, and more.
        - How are you feeding an animal's daily diet? Does it promote overall welfare based on the individual's needs? Does it facilitate quality care? Can it be improved?

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What's in there?

Lemur Voluntary X-Ray Set-Up and Training

Emily Ellison and Laura Klutts, Primate Keepers
Cameron Park Zoo
Waco, Texas

Abstract

Cameron Park Zoo in Waco, Texas currently houses 4.3 ring-tailed lemurs (*Lemur catta*) and 1.1 red ruffed lemurs (*Varecia rubra*). In 2014 and 2015, staff was able to confirm three separate pregnancies in adult twin ring-tailed lemurs, Capri Sun and Crystal Light, via voluntary ultrasound training. It was a valuable asset as both females were first-time moms in 2014. For both of Capri Sun's pregnancies she was carrying twins, but this was never confirmed with the voluntary ultrasound training. Even though there was some speculation of twins, there had to be a better way to determine the number of infants. Training began for voluntary x-ray imaging in June, 2015. The first image was taken on December 14, 2015, producing successful views. This training was accomplished because of keeper staff having previously developed positive relationships with the lemurs, the utilization of a target behavior, and desensitizing the lemurs to the x-ray platform and x-ray equipment.

Need for Training

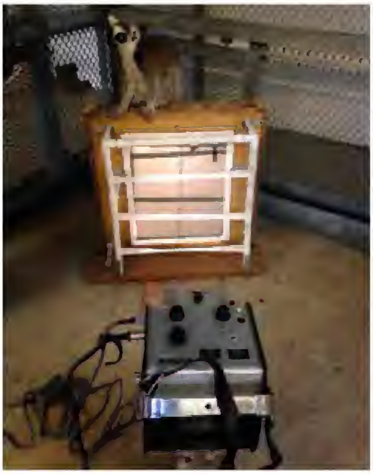
For the 2014 breeding season both ring-tailed twin females, Capri Sun and Crystal Light, received their first breeding recommendation from the Species Survival Plan (SSP). On March 18, 2014 Capri Sun gave birth to twin boys. Both males appeared smaller than a normal-sized infant and one of the males was roughly half the size of the other. The smaller male was born virtually hairless and had a weaker grip. Even though there was significant medical intervention of oral fluids and heat supplementation, the infant was found deceased the next morning after a successful reintroduction to the mother the day before. The larger male infant, named Snickers, continued to thrive with Capri Sun who was a phenomenal mom. On April 16, 2014 Crystal Light gave birth to a healthy baby boy, named Twix.

Both Capri Sun and Crystal Light received another SSP recommendation for the 2015 breeding season. Voluntary ultrasound training was maintained which successfully confirmed pregnancy in both females. Crystal Light gave birth to a healthy infant boy, named Rolo, on March 8, 2015. Capri Sun gave birth to twin girls on April 3, 2015 when one infant was found to be a stillborn. Similar to Capri Sun's previous offspring, both appeared to be smaller than normal size, with the stillborn infant even more underdeveloped than the healthy one. The second female infant, named Skittles, continued to develop at a normal rate.

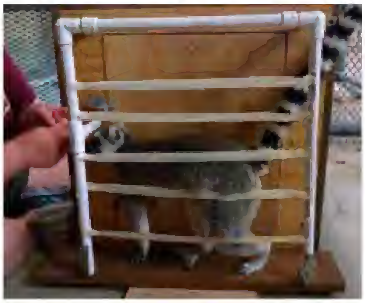
Voluntary ultrasound training was essential in confirming Capri Sun's pregnancies; however it did not absolutely identify the number of infants she was carrying. With implementation of voluntary x-ray training, staff would be able to definitively say how many infants to expect in future pregnancies, allowing for potential intervention planning or narrowing the birth window.

X-Ray Platform

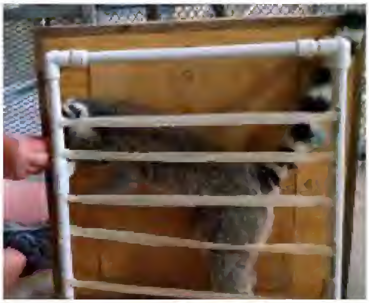
In order to obtain an x-ray, several challenges had to be overcome. First, a platform had to be custom designed and constructed with the following characteristics; it needed to be portable, hold the x-ray plate in place, offer a variety of body positions, and keep the lemur within three inches of the plate during imaging (Picture 1). Secondly, it was also important to consider the way that the mechanism holds the plate in relation to the animal's position. In Capri Sun's case, it was crucial to determine the number of infants. Therefore, the platform was designed and made to hold the plate vertically, behind the lemur at an ideal abdominal height. A PVC secondary structure was then built to keep the lemur in a lateral position within three inches of the plate and provide three different body postures. Staff also had to keep in mind that nothing could



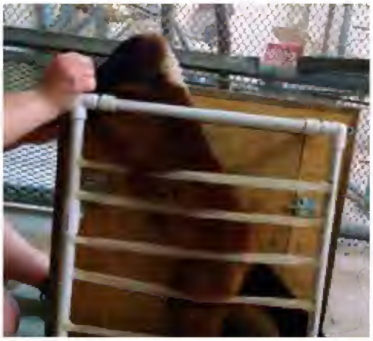
Picture 1. Cameron Park Zoo's x-ray platform and set up. (Showcased by Capri Sun, Ring-tailed lemur)



Picture 2. First of three various body positions desired for lateral x-ray view. (All four feet on ground.)



Picture 3. Second of three various body positions desired for lateral x-ray view. (Back feet on ground with hands on middle elevated bar.)



Picture 4. Third of three various body positions desired for lateral x-ray view. (Back feet on ground with hands on highest elevated bar.)

Picture 5. Successfully obtaining an x-ray on female ring-tailed lemur, Capri Sun, on December 14, 2015.

be between the x-ray machine and the lemur that would prevent imaging. This is why there is no PVC in front of the plate on the platform.

Training Method

A positive reinforcement training program with verbal of "good" as the bridge was already established with all the lemurs at the Cameron Park Zoo. Previously trained behaviors of "target", "up", and "four" were utilized in obtaining an x-ray. The "target" behavior aided with the desensitization of the lemurs to enter the platform. Once on the platform, the "up" and "four" behaviors allowed the trainers to position the lemurs three different ways, providing optimum views (Pictures 2-4). The criteria for the "up" behavior is for the lemur to stand on their hind legs and expose their belly while grasping onto various items. The criteria for the "four" behavior is for the lemur to have both hands and feet on the ground.

Using medical tape to create a barrier, which will not interfere with the x-ray, kept the lemurs positioned closely to the plate. As the lemurs became comfortable entering and positioning in the platform, the tape was slowly phased out, initially starting with five strips and ended with three strips when the x-ray was obtained. Desensitization then continued with various items and equipment including: x-ray vest, x-ray gloves, a second staff member, the x-ray plate and its holder, and the machine. Through each phase of desensitization, the lemur would need to hold completely still for about twenty seconds in order to obtain an image. Continual reward with a small spoonful of jelly or honey during the time the lemur is in full criteria of the desired position proved beneficial.

Success!

From beginning this voluntary x-ray training in June 2015, Capri Sun was successfully imaged in only seven months on December 14, 2015 (Pictures 5 and 6). Capturing this abdominal view would definitely aid in determining the number of infants during pregnancy. Due to the efficient design of the platform, the intended image needed was able to be captured with just one film being taken, limiting radiation exposure to the staff and animal. X-ray training with all of Cameron Park Zoo's ring-tailed and red ruffed lemurs will continue to be utilized as an excellent additional diagnostic medical tool.

Acknowledgments

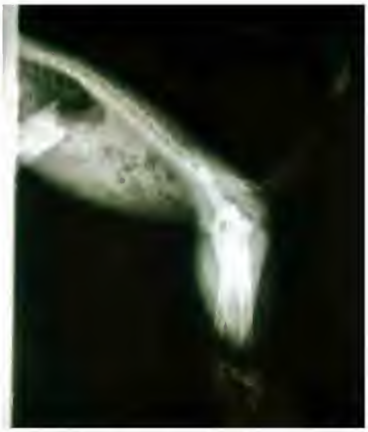
The authors would like to thank:
Cameron Park Zoo Management
Dr. James Kusmierczyk, Staff Veterinarian
Theresa Larson, and Primate Keeper
Ring-tailed Lemur SSP

BHC Comments by Kim Kezer

Each time we receive a submission for Training Tales I get excited to see how our AAZK members are incorporating training into their animal care programs. Instead of saying, "It would be nice if we could..." I see a shift in our way of thinking to, "How can we accomplish this medical procedure through training?" and "What will we need to achieve our goal?" Creative thinking and problem solving are essential components of behavioral conditioning. When we create our behavioral plans, not only do we think about the possible steps to train the behavior and reinforcement, we also think about what supplies we need, structures that may need to be built, and how much support from others we require to accomplish our goal. Think of all the skills and knowledge you have gained over time through your own training programs.

Not all animal areas are equipped with an ideal place to train or even an area to train at all. Another creative thinking and learning opportunity! You may need to build a training chute or modify an area, further developing your skills of how to safely use a variety of tools. Many behaviors that we train these days are used for a variety of medical procedures, with the end goal of eliminating the need to capture, restrain or chemically immobilize an animal. Training projects like these require keepers to become familiar with the medical procedure itself, providing a better understanding of what behaviors need to be trained, as well as parameters helpful to veterinary staff such as positioning and duration. Lastly, having working knowledge of the (usually expensive) medical equipment to be used is essential. Knowing the sounds it makes, lights that may flash, and parts that may move will help you and the animal achieve your goals.

This Tale is a great example of this process. Once a plan was developed, the authors built an x-ray platform using the skills mentioned above. They knew the position and duration parameters to train the lemur to obtain the best imaging. Using medical tape is a great idea, as it is easy to put up, move around and remove as needed (I will happily use this idea in the future!). The knowledge they gained while preparing for this training project helped to set them up for success and achieve their goal. Congratuations on the successful radiographs and little ones! Thank you for sharing your Training Tale.



Picture 6. Film of first successful x-ray of Capri Sun's abdomen.

Share Your Training Tale!

Please submit your "Training Tales" and experiences in operant conditioning to share with *Animal Keepers' Forum* readers. This opportunity provides a convenient outlet for you to exhibit your training challenges, methods and milestones with the AAZK member network. Please submit entries based on the following guidelines:

- Submit a brief description of a training project at your facility. These can be 500 words or less, in text or bullet points – it can be longer (up to 1000 words); however, short and simple descriptions with a few images are just as perfect. Details should include the following:
  - Define the training goal (what did you try to do and for what purpose?)
  - List important steps (How did you do it – include plans that changed along the way/what worked and what didn't work)
  - Timeline used (how long did it take)
  - Tips you learned along the way
- Include 3-5 digital photos that clearly depict the animal in the learning process or performing the desired goal (provide photo caption and photographer of each image). Photos need to be 300 dpi and at least 1200 x 1800 pixels.

PLEASE SEND SUBMISSIONS
OR QUESTIONS TO:
Kim Kezer at
kkezer@zoonewengland.com or
Shane Good at shane.good@aazk.org
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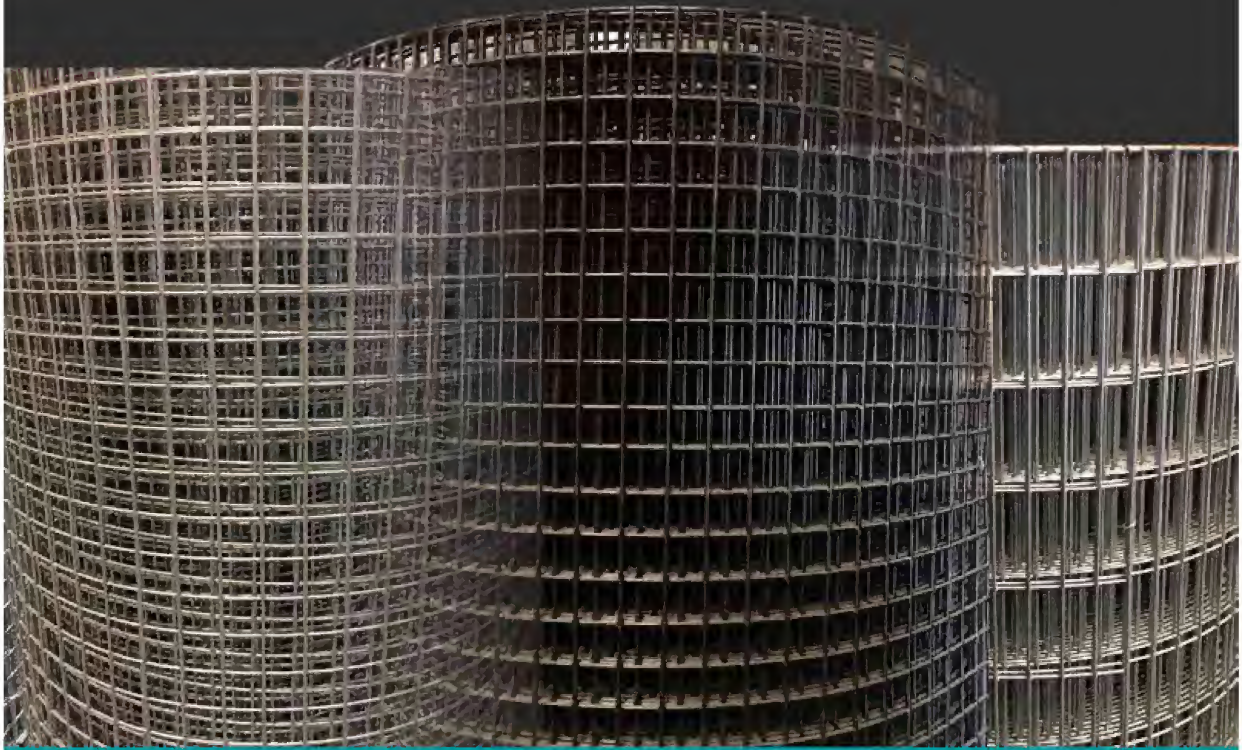

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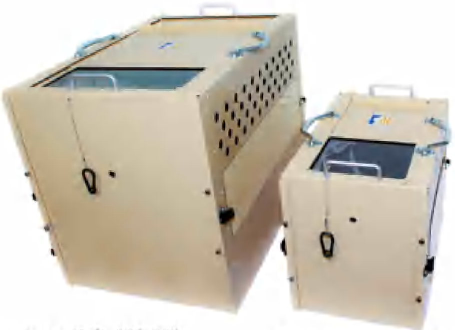

Large Unit 912-112 **Standard Unit 912-106**

STANDARD FEATURES

- Designed with Input from Leading Zoos
- Tested in the Field by Professional Keepers
- Enhanced Safety for Patient and Doctor
- Integrated Anesthesia Gas Connections
- Quick Seal Design
- Lockable for Dangerous Animal Handling
- Guillotine Doors for Quick Capture
- Viewing Window with Slider
- Complete Darkness in Transit
- Clear Monitoring During Gas Delivery
- Durable Powder Coat Finish
- Light Weight All Metal Construction
- Dual Carry Handles for Quick Transport
- Carabiner Quick Lock for Securing Unit
- Optional Extension Tunnel for Enhanced Acclimatization
- 2 Year Limited Waranty

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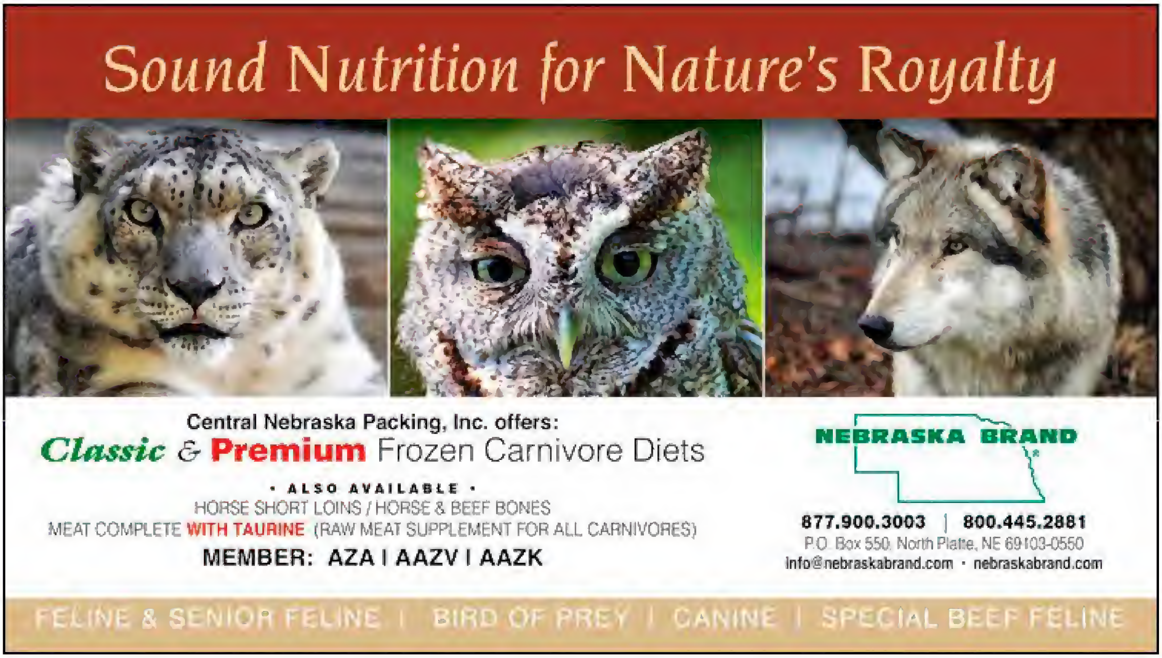
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